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ABSTRACT

Cognitive abilities of social drinkers are generally thought to be affected by alcohol only during acute intoxication, but several studies suggest that sober-state performance may be affected by the quantity of alcohol consumed per drinking episode. Although the findings regarding sober-state mental deficits in social drinkers are inconclusive, the possibility that acute intoxication effects may persist into the sober state is important, especially for young drinkers who are developing cognitively. Probably no single, straightforward relationship between high-quantity consumption (more than five drinks per occasion) and decreased mental efficacy exists; rather, the relationship is complex. Other factors requiring further study include the individual's psychological distress level and concurrent use of other psychoactive drugs. Additionally, tests used in past research may not have been sensitive enough to detect subtle mental deficits. Longitudinal studies are needed to detect subtle decreases from previously higher levels of functioning within individuals. Specific knowledge about cognitive effects of certain drinking patterns may enhance prevention efforts, presenting messages that are consistent with users' experience and more valid than current, simplistic analogies comparing the user's brain to a fried egg, for example. (MSF)

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by Marsha Bates

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New Jersey Alcohol / Drug

RESOURCE CENTER AND CLEARINGHOUSE

Center of Alcohol Studies, Rutgers University

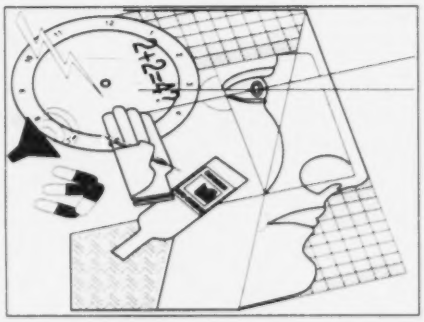
ALCOHOL IMPAIRMENT AND SOCIAL DRINKING

Marsha E. Bates, Ph.D.

It is widely recognized that newly abstinent alcoholics often show cognitive impairments, especially in the areas of abstract reasoning, memory, perceptual-motor skills, and new learning. In many cases, these chronic effects appear to accumulate over time as either a direct or indirect result of long-term, excessive alcohol consumption. That is, in addition to a direct toxic effect that alcohol may have on the central nervous system, other factors such as liver dysfunction, traumatic head injuries, and psychiatric conditions may all contribute to the cognitive or mental deficits often found in chronic alcoholics. However, if the alcoholic stops drinking, mental impairment may not be permanent. Substantial recovery of function may be achieved over time with continued abstinence, although in many alcoholics, impairment does not appear to be fully reversible.

In contrast, the cognitive abilities of social drinkers are generally thought to be affected by alcohol only during acute intoxication. The state of acute intoxication refers to the time during which alcohol is actually present in the bloodstream and body tissues and organs. It has been assumed that, with the possible exception of short-lived "hangover" effects, there are no lasting alcohol effects on the cognitive efficacy of non-problem drinkers.

During the past fifteen years, however, this notion has been challenged by a number of studies reporting that the typical quantity of alcohol that a social drinker consumes per drinking episode is related to sober-state performance on tests of verbal abstracting abilities. The initial research in this area suggested that the consumption of approximately four or more drinks per occasion, regardless of the frequency of drinking occasions, may induce subtle cognitive impairments that persist after all alcohol has left the bloodstream. When tested in the sober state, high-quantity drinkers were not found to score in the clinically impaired range on tests of mental abilities. However, they did perform relatively less well on certain cognitive tests than their lower-quantity-per-occasion peers. Subsequent studies performed in a



number of different laboratories with a broad range of mental tests have yielded mixed results, including the finding of no relationships, positive relationships, and negative relationships between the quantity and frequency of alcohol use and the cognitive performance of social drinkers. In other words, no consistent, reproducible relationships have been found between the drinking habits of social drinkers and their ability, when in the sober state, to perform a range of neurocognitive tasks involving verbal skills, abstract reasoning, visual-spatial skills, and memory. Nevertheless, studies of moderately-intoxicated social drinkers show that the mental skills involved in abstract reasoning, decision making, and other aspects of information processing are often impaired while alcohol is present in the bloodstream.

In general, the relevant literature demonstrates that alcohol deficits most often appear on tasks requiring attentional resources, selective processing, and effortful analysis. A particularly disruptive effect of alcohol may be to induce a general non-deliberate, non-strategic, passive, and non-analytic mode of processing information. Although the findings regarding sober-state mental deficits in sober social drinkers have been inconclusive to date, the possibility that acute intoxication effects on mental abilities may persist into the sober state is of critical importance, especially for youthful drinkers who are still undergoing cognitive development. The persistence of information processing disruptions to the sober state, even if subtle or short-lived, may impede the development of competencies needed to function successfully as an adult.

Youthful drinkers often engage in the episodic, high-quantity consumption that may heighten the risk of negative cognitive consequences. For example, a recent national survey of drinking practices found that 37% of high school seniors had at least one episode of high quantity consumption (more than 5 drinks) in the previous two weeks. If high-quantity-per-occasion use, regardless of the frequency of use, induces subtle, yet persisting impairments to certain cognitive abilities, then a larger segment of youth may be at risk for drinking-related problems than previously suspected. From this perspective, the poor identity formation and impaired psychosocial development thought to be associated with adolescent alcohol and other drug use may be linked to delayed cognitive development and related effects. At the same time, the inconsistent results that have been found across different studies indicate that there probably is not a simple, straightforward relationship between high-quantity alcohol consumption and decreased mental efficacy in social drinkers. Rather, several lines of research suggest that the relationship between drinking habits and cognitive abilities is quite complex for both social drinkers and alcoholics. There are, for example, large individual differences in central nervous system vulnerability to

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alcohol effects. In addition, some studies of individuals at high risk for the future development of alcohol problems suggest that cognitive deficits may precede the onset of more intensive alcohol use in certain high-risk populations. Additional factors that require further study include the individual's level of psychological distress and the concurrent use of other psychoactive drugs. Finally, it is possible that the tests that have been used to uncover deficits in social drinkers may not be sensitive enough to detect subtle mental deficits. That is, the tests that have been used in past research were developed to measure severe cognitive impairments of clinical significance. The detection of less severe information-processing deficits that are linked to alcohol or other drug use in nonclinical populations may require more difficult and sensitive tasks.

Overall, the most recent studies of the link between alcohol use patterns and neurocognitive abilities in social drinkers suggest that increasing age and the frequency with which relatively high-quantity drinking episodes occur may increase vulnerability to persisting alcohol effects. Ultimately, longitudinal studies are needed to control for prior differences in cognitive status and to track age-related vulnerabilities to alcohol. Longitudinal studies involve the repeated testing of the same individuals over a number of years, and are able to provide information about how individuals change over time. Detecting subtle decreases from previously higher levels of functioning may only be possible by studying within-individual changes in drinking patterns and cognitive abilities over time.

Given that complex adult behaviors often develop and sustain across lengthy time intervals, it is clear that knowledge of the effects of certain patterns of alcohol use on the cognitive building blocks of important adult skills may enhance prevention efforts. For instance, prevention messages based on knowledge of the precise consequences of alcohol use may have greater impact because they contain an implicit threat, but also because they are more specific and accurate. Prevention may thus move away from merely relaying simplistic analogies which, for example, portray users' brains as "fried eggs" to more valid communications of subtle cognitive performance deficits that may occur as a consequence of moderate to heavy use. In addition, messages that are more consistent with users' experiences would increase the impact of intervention efforts in the area of secondary prevention. The results of continued research in this area may also be used to guide the "form" of primary and secondary prevention messages so that information can be presented in an understandable fashion to various groups including (1) those who have not yet decided whether, or in what pattern, to use alcohol, (2) youthful, high-quantity users unaware of the potential consequences of use, and (3) adults receiving alcohol education within the context of counter-measure, driving-while-intoxicated, and other secondary prevention programs.

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